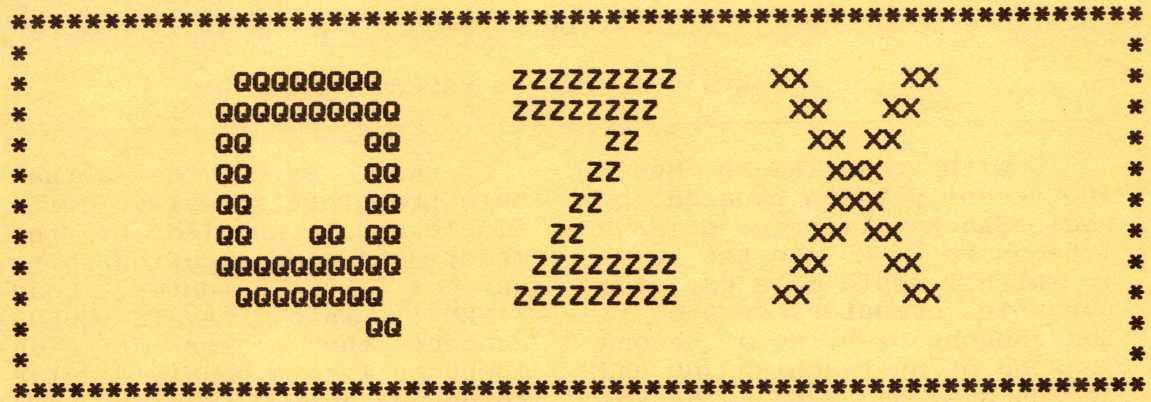

The Journal Covering Amateur Radio & Sinclair Computers
ZX-80; Micro-Ace; ZX81; T/S 1000, 1500, & 2068

2025 O'Donnell Drive

K5XY — Las Cruces, New Mexico — W4GHV/5

Alex. F. Burr — 88001 — Bo Barry

Publisher — Editor

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* Dipole Antenna Pruner, KP4MD
* Publisher's Notes
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* QZX Friends
* Hot Chassis TV Sets, WA1IAO
* Machine Code & M-Log, K5XY
* Bits & Bytes
* Unclassified Ads

COMING UP

Fresnel Lens Antenna Update, WA6DLI
Yagi Beam Design, W2MS
Sunrise, Sunset Program, KA2LHO

USING TRS-80 TEXT FILES ON YOUR TS 2068??? RIGHT!!!!

by

Kraig D. Pritts-KA2LHO

With the TRS-80 Model 100 recently being reduced by Radio Shack to a price of $299 I began to look into the ways in which I would make use of a portable computer system. I had thought of using a second TS 2068 at my teaching job and adding a second A & J Microdrive system and a second monitor, etc., etc., and looked at the Model 100 to take its place. Initial expense was not much more than a second Sinclair system, but nothing could be exchanged between to two computers so it would be useless to look any longer at the Model 100 right? Wrong!!!

Recently, while on Compu Serve, I "heard" (actually read) that it was a very simple task to transfer text files from the Model 100 to the TS 2068 via the 2050 modem. I read on with interest and found enough information that I went out and bought an 8K Model 100 that weekend. I realized that 8K would not get me far, even with the five programs built into the memory so I quickly looked into extra memory. Through a third party vendor I obtained three more 8K modules for $80.85 total and upgraded my portable job to 32K. Now I could write some letters!!!! I tried out the transfer and found that it works like a charm. Data from most programs on the Model 100 can be saved into memory as text files and, as a result, be transferred into the MTERM and modem equipped 2068 with ease. Once into MTERM's buffer, I save the data as text files using tBUFF and reload them into Tasword II.

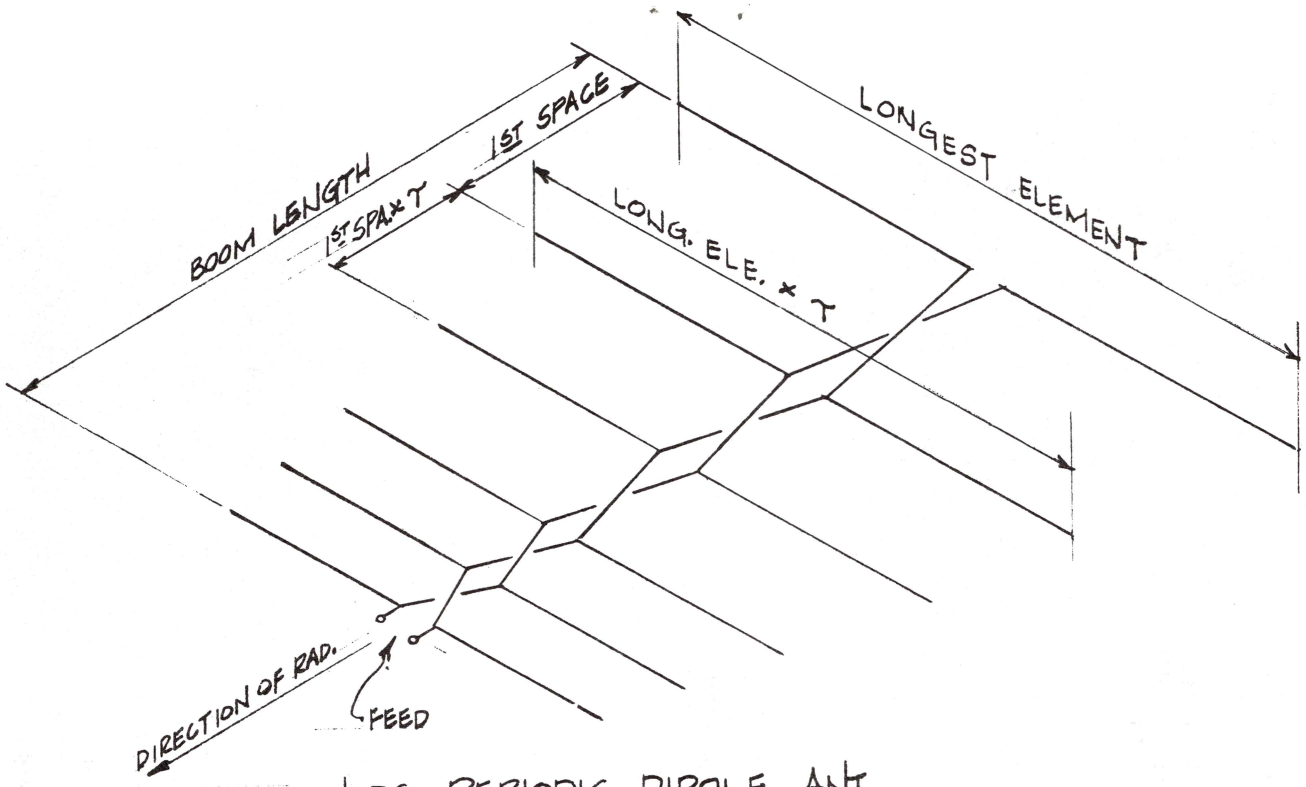
As I said, the actual data transfer is really quite simple and is handled by the modems and communication software of each computer. Load MTERM II into the TS 2068, connect the modems of each computer into a double modular telephone jack, and match the software parameters (word, stop, parity, etc.). Put your 2068 into the TERMINAL mode and dial your own telephone number (on the telephone, not from the keyboard). Have the Model 100 in its TELCOM software and the switch on its left side in the ANS position. As soon as you hear the connection is made, give the 2068 the MODEM COMMAND? M. Hang up your telephone and the connection is made. Simply upload your text file from the Model 100 and you will see it being received on the 2068 monitor. BE SURE THAT YOU HAVE OPENED YOUR BUFFER ON THE 2068 BEFORE STARTING TO RECEIVE DATA.

I have used this system for about two months and find it very convenient to be able to carry a complete system in my briefcase and access text formatters, spreadsheets, etc. at my convenience without the worry of cables, power supplies, monitors, etc. Even without the extra memory there is adequate space to store a decent size article or letter. I am sure that similar techniques could be used between the 2068 and other machines and I would be interested in hearing from others who have experimented-particularly in the area of IBM and Apple. If you would like a response please include and SASE.

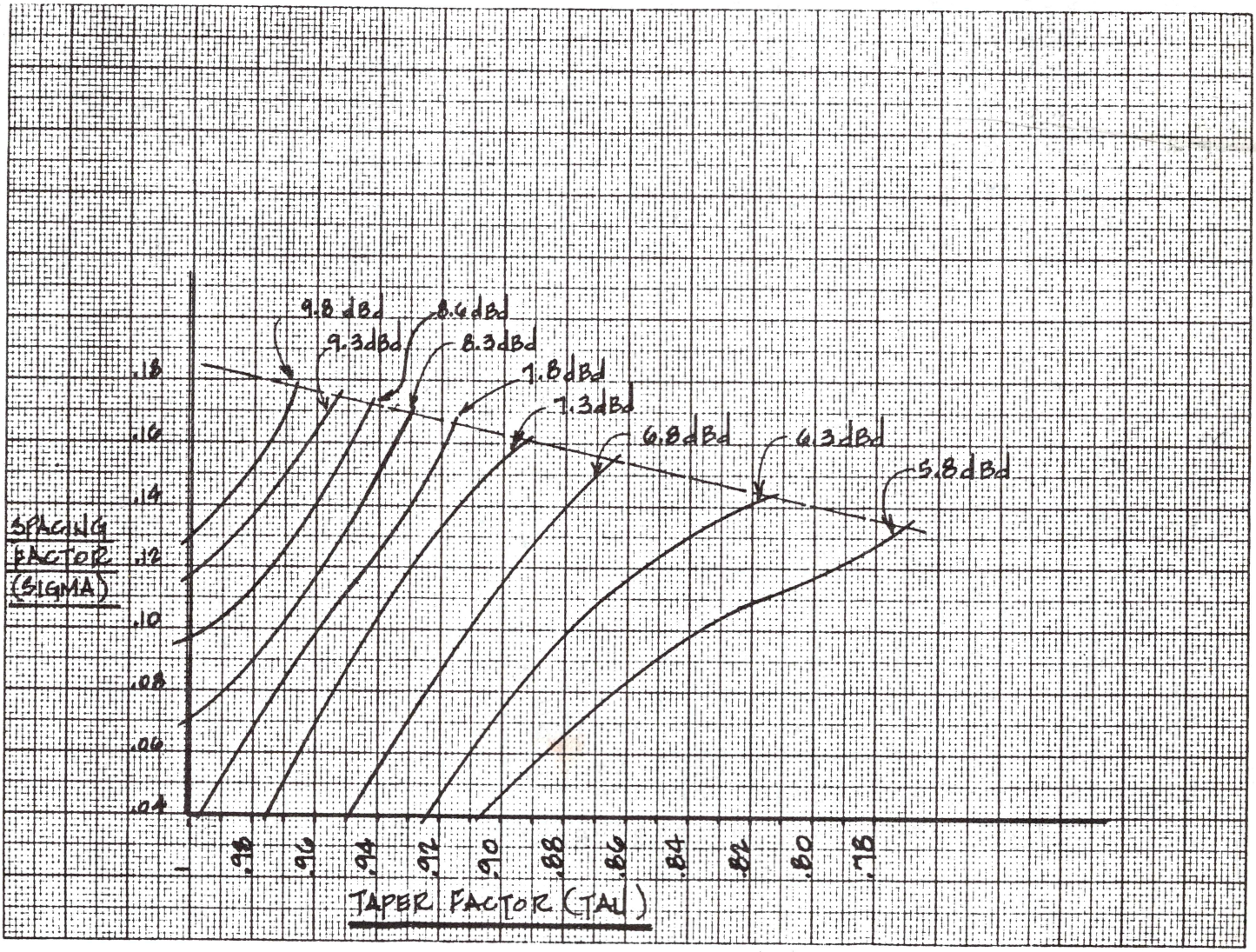
3421 Oneida St., Chadwicks, NY 13319

```
10 REM LOG PERIODIC ANTENNA PROGRAM
20 REM REF HAM RADIO MAGAZINE DEC 79
30 REM TAPER AND SPACE FACTOR HAVE
40 REM DIRECT BEARING ON ANT GAIN
50 REM HIGHER FIGURES ANT HAS HIGHER
60 REM GAIN ALSO MORE ELEMENTS AND
70 REM LONGER BOOM.  ELIMINATE REM
80 REM STATEMENTS TO RUN ON 2K
90 REM TS-1000.  GUD LUCK, KB7NV 12-27-84
100 SCROLL
110 CLS
120 SCROLL
130 PRINT  "LPD ANTENNA DESIGN"
140 SCROLL
150 PRINT  "******************"
160 SCROLL
170 PRINT  "LOW FREQ. (MHZ) ?";
180 INPUT FL
190 PRINT FL
200 SCROLL
210 PRINT  "HIGH FREQ. (MHZ) ?";
220 INPUT FH
230 PRINT FH
240 SCROLL
250 PRINT  "TAPER FACTOR (.78-.99)?";
260 INPUT T
270 PRINT T
280 SCROLL
290 PRINT  "SPACE FACTOR (.02-.18)?";
300 INPUT S
310 PRINT S
320 SCROLL
330 LET BS=(FH/FL)*((30.8*S*(1-T))+1.1)
340 LET W=984/FL
350 LET L1=((1-(1/BS))*(4*S/(1-T))/4)*W
360 LET N=(LN BS/LN10)/(LN(1/T)/LN 10)+1
370 LET G= INT (N+.5)
380 LET L= INT (100*(L1*(G/N))+.5)/100
390 PRINT
400 SCROLL
410 PRINT  "BOOM LENGTH=";,L;" FT"
420 SCROLL
430 PRINT  "NO./ELEMENTS=";,G
440 SCROLL
450 PRINT
460 SCROLL
470 PRINT  "CONTINUE? (Y/N) "
480 IF INKEY$="" THEN GOTO 480
490 LET B$= INKEY$
500 SCROLL
510 IF B$= "N" THEN GOTO 790
520 CLS
530 SCROLL
540 LET E= INT (100*(469/FL)+.5)/100
550 LET Z= INT (100*(W*S)+.5)/100
560 PRINT  "EL NO. 1", "LG= ";E;" FT"
570 SCROLL
580 PRINT
590 SCROLL
600 PRINT  "   SPACE= ";Z;" FT"
610 SCROLL
620 PRINT
630 SCROLL
640 FOR Q= 2 TO G
650 LET R= INT (100*(E*(T**(Q-1)))+.5)/100
660 LET M= INT (100*(Z*(T**(Q-1)))+.5)/100
670 PRINT  "EL NO. ";Q;,"LG= ";R;" FT"
680 SCROLL
690 IF Q=G THEN GOTO 790
700 PRINT
710 SCROLL
720 PRINT  "   SPACE= ";M;" FT"
730 SCROLL
740 FOR D=0 TO 100
750 NEXT D
760 PRINT
770 SCROLL
780 NEXT Q
790 PRINT  "TRY AGAIN? (Y/N) ";
800 IF INKEY$= "" THEN GOTO 800
810 LET A$= INKEY$
820 IF A$ = "Y" THEN GOTO 100
830 REM
840 REM
850 REM EARLY VERSION HAD A MISTAKE ON LINE
860 REM NO. 380, THIS HAS BEEN CORRECTED.
870 REM A DELAY LOOP HAS BEEN ADDED TO LENGTH
880 REM AND SPACE READ-OUT TO SLOW IT DOWN,
890 REM ELIMINATE LINES 740 & 750 IF NOT NEEDED.


9700 REM DEC-LOADER
9702 DIM P$(4)
9704 PRINT"DEC-LOADER READ OR W
RITE ?  (R/W)"
9706 INPUT M$
9708 PRINT "START ADDRESS    ";
9710 INPUT S
9712 PRINT S;"        ";M$
9714 PRINT "FINISH ADDRESS   ";
9716 INPUT F
9718 PRINT F
9720 PAUSE 100
9722 IF M$="R" THEN GOTO 9764
9724 FOR N=S TO F STEP 5
9726 PRINT N;"-";
9728 LET T=0
9730 LET Z=0
9732 FOR P=1 TO 5
9734 INPUT D
9736 LET P$=STR$ D
9738 PRINT P$;
9740 LET T=T+D
9742 POKE N+Z,D
9744 LET Z=Z+1
9746 NEXT P
9748 PRINT "= ";T
9750 REM PRINT AT 21,0;""""N/L""=
OK  ""E""=ERROR   ""S""=STOP"
9752 REM PAUSE 4E4
9754 REM IF INKEY$="E" THEN GOTO
 9726
9756 REM IF INKEY$="S" THEN STOP

9757 REM IF INKEY$<>"E" OR INKEY
$<>"S" THEN CLS
```

CONTD PG. 6



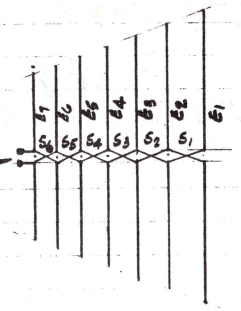
LOG PERIODIC DIPOLE ANT



7 ELEMENT - HOME BREW - LOG PERIODIC

WB7SUZ (KB7NV)
MARCH, 1980

FREQ. RANGE = 21.0 - 28.6 MHz



BALANCED 52 Ω FEEDPOINT

NOTE: ELEMENTS INSULATED FROM METAL BOOM

$\beta = 28.6/21 = 1.362$

$\tau = 0.91 \qquad \sigma = 0.06 \qquad$ GAIN = 6.3 dBd OR 8.5 dBi

$BAR = 1.1 + (30.8\ (.09)(.06) = 1.266 \qquad \beta_S = (1.266)(1.362) = 1.724$

$$\text{BOOM LENGTH} = \frac{(1 - .58)\left(\frac{(4)(.06)}{.09}\right)}{4} \times \frac{984}{21\ \text{MHz}} = 13.12'$$

$$\text{No. OF ELEMENTS} = 1 + \frac{\text{LOG } B_S}{\text{LOG } 1/\tau} = 6.775 \text{ OR } 7$$

ADJUSTED LENGTH = $7/6.775 \times 13.12 = 13.56$

SPACING:

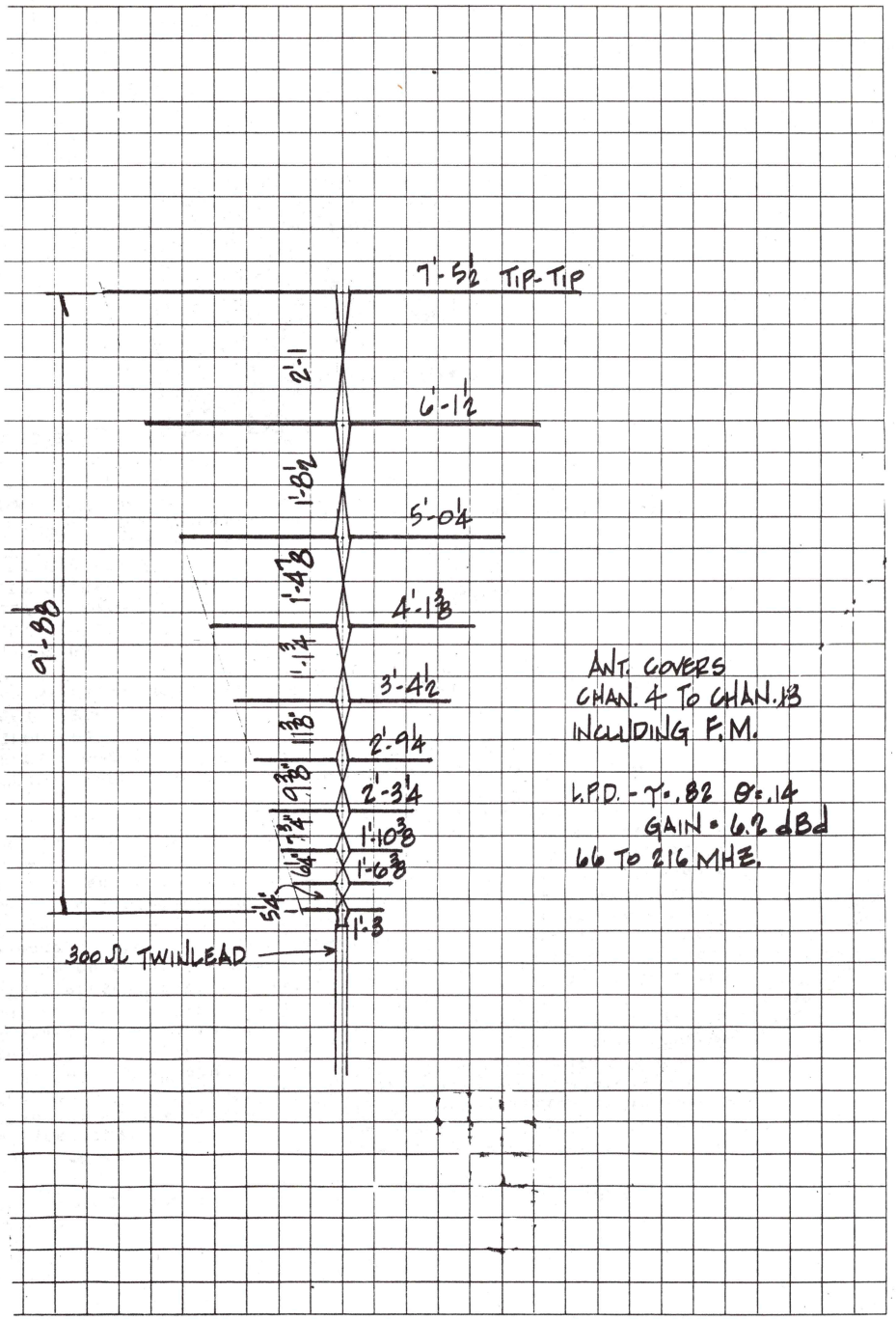
$S_1 = (\sigma)(\lambda_L) = (0.06)(46.857') = 2.81'$
$S_2 = (S_1)(\tau) = 2.56'$
$S_3 = (S_2)(\tau) = 2.33'$
$S_4 = (S_3)(\tau) = 2.12'$
$S_5 = (S_4)(\tau) = 1.93'$
$S_6 = (S_5)(\tau) = 1.75'$
BOOM LENGTH = 13.5'

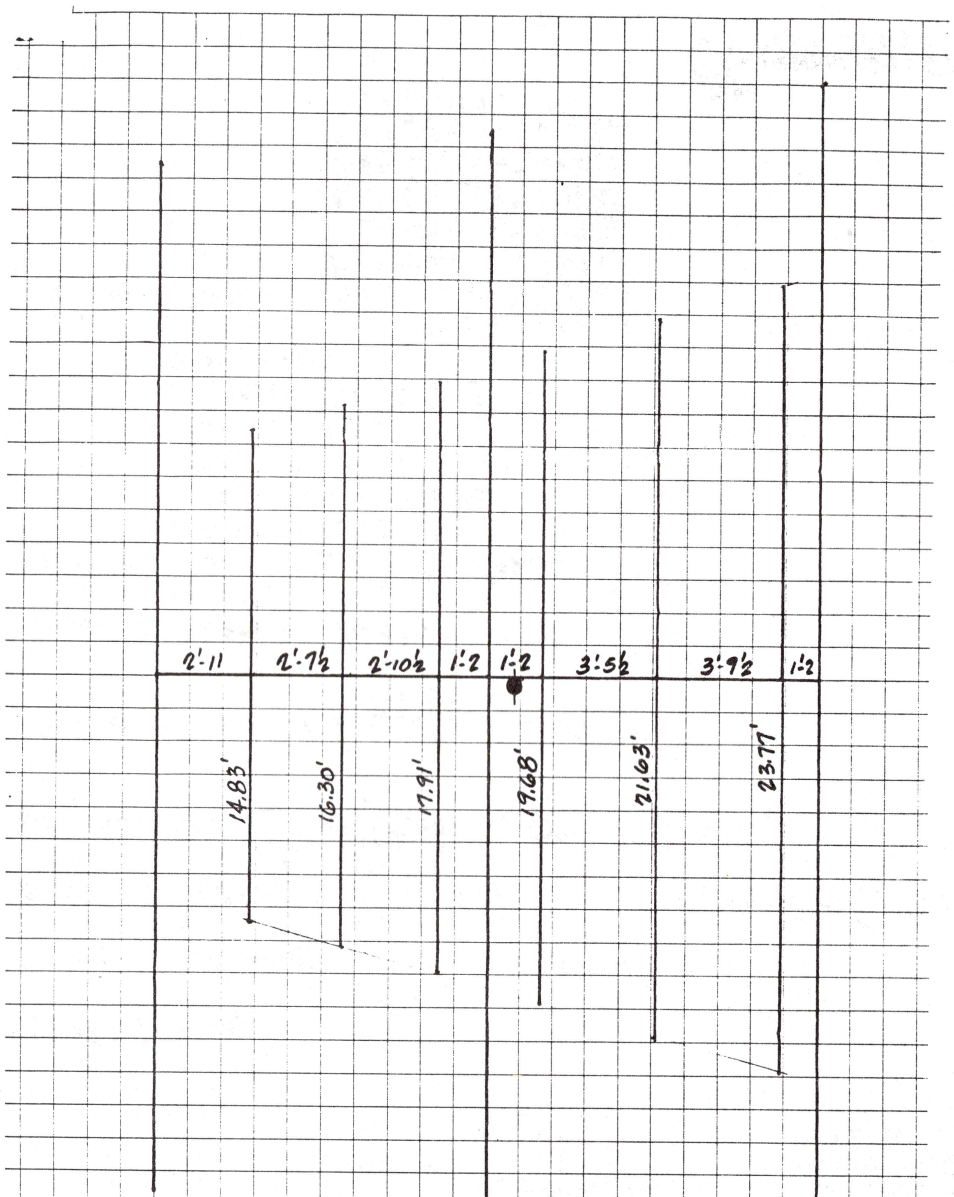
ELEMENT LENGTHS:

$E_1 = 492/21 = 23.43'$
$E_2 = (E_1)(\tau) = 21.32'$
$E_3 = (E_2)(\tau) = 19.40'$
$E_4 = (E_3)(\tau) = 17.66'$
$E_5 = (E_4)(\tau) = 16.07'$
$E_6 = (E_5)(\tau) = 14.62'$
$E_7 = (E_6)(\tau) = 13.31'$

5

REF:
HAM RADIO DEC. 79





20.7 TO 28.6 MHZ LOG PERIODIC ADDITION TO 3-EL 20 M. BEAM (20' BOOM)

B = 1.38 B_S = 1.8262

T = 0.91 Q = 0.08 GAIN = 6.5 dBd

BOOM = 18.12 7 ELEMENTS

(2) FEEDLINES

DIPOLE ANTENNA PRUNER by C. Milazzo, M.D., KP4MD

This short program may be useful to those who occasionally must adjust the length of a new half-wave dipole or inverted vee which did not resonate at the theoretical design frequency (length in feet = 468/freq MHz). The usual response of such an unfortunate individual is trial and error "pruning" of antenna length, possibly involving multiple climbs to hazardous heights. The purpose of this program is to decrease the anxiety and risk of these occasions through a methodical approach which reduces the trial and error.

This program does not attempt to quantify all the factors that affect the resonant frequency of an antenna. It does assume that any difference in the observed resonant frequency is due to an effective change in the "468" factor in the above equation. The program estimates length adjustments based on successive measured resonant frequencies and the recursive method of this algorithm should quickly converge on the final result. The program gives results for each side of the dipole (i.e. each quarter wave section); therefore, it should also be directly applicable to 1/4 wave vertical antennas.

```
 10 PRINT "DIPOLE ANTENNA PRUNER BY KP4MD","DESIRED RESONANT
FREQUENCY","MHZ ";
 20 INPUT F1
 30 LET X=234
 40 PRINT F1,,,,"MEASURED  CHANGE EACH SIDE","FREQ MHZ   FEET
INCHES"
 50 INPUT F2
 60 LET F=ABS (X/F1-X/F2)
 70 LET I=12*(F-INT F)
 80 LET S=16*(I-INT I)
 90 LET L$="+"
100 IF F1>F2 THEN LET L$="-"
110 PRINT F2";TAB 10;L$;INT F;TAB 16;INT I;" AND ";INT (S+.5);"/16"
120 INPUT F3
130 LET X=F/(1/F3-1/F2)
140 LET F2=F3
150 GOTO 60
```

```
9758 NEXT N
9760 STOP
9762 REM ***READ***
9764 FOR N=5 TO F STEP 5
9766 PRINT N;"-";
9768 LET T=0
9770 FOR B=0 TO 4
9772 LET P$=STR$ (PEEK (N+B))
9774 LET T=T+VAL P$
9776 PRINT P$;
9778 NEXT B
9780 PRINT "= ";T
9782 LET N=N+5
9784 IF N>F THEN STOP
9786 GOTO 9766
9788 SAVE "DE■"
9790 GOTO 9700
```

PUBLISHER'S NOTES

QZX is a bigger project than it looks. Since Bo and I took it over, we have spent almost $5000 on postage and $5000 on printing, besides the other expenses. We have had subscribers from all states and about 20 different countries but have never had enough subscribers to make use of the bulk mailing economies. The renewal rate has slowed down quite a bit the last couple of months. This issue represents the last for more people than any other month. Fortunately many of these people are long time subscribers who started reading QZX before Bo and I even knew it existed. If your subscription expires this month (a red circle around your expiration date) please renew now before you forget and if you know of any other hams with Timex Sinclair computers suggest they subscribe.

We are trying to develop more benefits for readers with efforts like the FIDO system described in this issue. Bo has put together this system with his own equipment. We hope it will be useful.

We get a continuous stream of requests for back issues. If the issue is more than two years old, it is sold out and costs too much time to reproduce on a single basis. Therefore Bo and I are looking into the possibility of reprinting most of the programs and information of permanent worth in a book. As near as we can figure out, there will not be enough demand to pay for resetting the type on the old programs. That means we will have to reproduce the programs from the best available copy which occasionally is not too good. The type in the book will not be uniform either, but it would be the best single source of ideas for the use of the Timex and Sinclair computers in ham radio. We estimate the book would be about 200 pages long and cost about $19. We would like to get an idea of how many would be interested in such a book. If you are interested, why not drop us a postcard. While you are at it include some information about yourself, your plans, and your equipment for use in the Friends column.

See you next month with the December issue in December.

QZX FRIENDS

W6FKQ -- Art renewed his subscription for two years even though we do not offer a discount for doing so. (But we do put the subscription money into a separate account to insure fulfillment.)

W9CQD -- Russ is a long time subscriber who renewed early. He also enclosed a note asking for increased net participation, which was printed last month.

KP4MD -- Charles says that he has written very few amateur radio applications recently because QZX has published such a wide variety of programs that it is hard to find something that hasn't already been done. If readers will send in suggestions for KP4MD, and other programmers, QZX will publish a list of the desired programs.

W*6AST -- Kenneth writes that he has two T/S 1000's with three 16 K ROMs and a T/S 2068 which he uses mostly on cw/rtty/ascii. He has ordered a spectrum emulator especially because he intends to retire to England in about a year.

W*9MAT -- Ken wrote that he has a fat file of projects for his T/S 100 that he is able to work on only slowly. He is says that audio and voice recognition projects are very interesting to him and thought that perhaps one of our subscribers could contribute software and or hardware projects in that area.

QZX FIDO NET NODE
Alex. F. Burr K5XY

That surely is a cryptic title for an article. What it means is that QZX is now hooked up to the nation-wide computer network called FIDO NET. FIDO NET is a collection of more than 600 bulletin boards spread out all across the nation (and even to foreign countries). This network permits the inexpensive exchange of electronic messages though control stations called nodes. There is probably one near you.

FIDO NET

Each node automatically calls up, in the middle of the night, all the nodes for which it has messages. These nodes then hold the messages until the addressee checks in to read them. All the nodes have similar operating procedures. Most charge a modest sum for forwarding messages to pay for the long distance calls involved. Because the messages are sent at night and at a high data rate, these charges are relatively low.

All the FIDO NET nodes can be reached through the network or directly

via long distance calls. I will describe exactly how the FIDO NET node works in both these modes. You can practice on the node nearest you with little line costs. Then you can join the nearest FIDO node, and then send messages to QZX and receive your answers back through that node; or call the QZX node directly and read the QZX files in the QZX area. You can also leave files for the magazine there.

First a general description of the node will be given, then message reception and initiation covered, file transfer outlined, and then the sign up procedures will be described.

The QZX FIDO NET node was originally based on a Sanyo IBM compatible computer. That computer is now located in the editor's home and the node is installed in another IBM compatible computer. The QZX node is in network 15 node 1006. These two numbers should be noted as they will be part of the address of any message you send to us. The node operates with 8 bit words, no parity, and one stop bit. These parameters permit the accessing station to use 7 bit words with either parity when using ASCII material. The QZX modem permits data rates of 300, 1200, or 2400 baud. Not all nodes support 2400 baud.

The typical FIDO NET board is organized in three sections. The main section, which controls the sign in and auxiliary functions, then feeds one into either the message section or the files section. One can exit from any of these sections by typing G or hanging up the phone. One is directed around the bulletin board by menus. Help screens are available at every choice so the board is easy to use. Because this article is designed to get you started, only a few of the alternatives will be discussed. You can find out about the others by using your local FIDO station or downloading the documentation from the nearest FIDO NET.

MESSAGE SECTION

If you type M at the end of the main menu, you will be transferred to the message section and shown the message menu. When you first sign on to the QZX node, you then will be in the general message area. If you next type A, a list of all the message areas will be shown. The QZX message area is 11, so type that. You will be shifted to that area and asked if you wish a search to be made for mail for you. I usually answer no here as I like to look at all the public messages, not just the ones specifically addressed to me. You are then asked for your next command. I use R to read the messages. A read menu then appears. Each time you press <cr>, a carriage return or enter, the next public message will appear on your screen. A simple <cr> after reading it will advance you to the next one. The QZX node will remember the number of the last message you read, so that it will start from that number the next time you sign in; thus you do not have to read old messages. But if you do want to read an old one, all you have to do is type in a number instead of the <cr>.

If you type E, you will be able to Enter a message. The node will prompt you thru each of the required steps. It will ask you for the addressee, the subject, and the type. The type can be either public, so any user can read it, or private, which can be seen only by the addressee or you (or the sysop). A carriage return (<cr> or enter) by itself will end the message. You can then send the message by following help instructions or type S to Save it.

If you type R, you can easily Reply to the last message read. Just follow the prompts.

Send Q to Quit reading messages. If you type M, you will be returned to the Main menu. If you type G (Goodby) you will be given a chance to leave a message to the SYSOP (Bo) and will then be disconnected.In either case, the node will remember the message area you were last in and automatically return you to that area when you next request the message section.

FILES

From the main section, you can request the File section by typing F. A procedure similar to the procedure for the message section will take you to the file section reserved for QZX. This section is number 11. There you will find all the QZX files.

To see a List of all the files available type L. To see what a specific file contains, type T. The list will have given you the length of the file, so you can estimate how long it will take you to have it Typed to your screen. (A little over 2K bytes per minute at 300 baud.)

Files can be Uploaded or Downloaded using a number of different protocols. If your communication program supports one of the popular protocols, such as Xmodem, you will most likely find that

FIDO NET supports it too. If you do not find our node compatible with your software, you can always use the plain ASCII mode. Of course, that mode has no error checking at all and is highly unsuitable for machine language or any non-ASCII files (like many BASIC programs).

I place many of the articles for the forthcoming issues of QZX in this file area. Bo then picks them off the board and prepares them for the printer. Thus you can get part of the next issues of QZX from this area. All articles do not appear here, only the ones which I have to enter into the computer. We also try to put short notes of interest to T/S hams here when we run across interesting items. No program listings are in this section now, but readers are welcome to upload some.

Again typing G will cause you to leave the node. Typing M will return you to the main menu. Here too the computer will remember which file area you last left and return you to it automatically the next time you request the file section.

INITIAL SIGN ON

Here the initial sign on procedure is detailed so you can get on the QZX node directly. First call (505) 646-5194. Normally the QZX FIDO NET node is listening here 24 hours a day, seven days a week. The node is quite active, but you usually will not get a busy signal. The QZX modem will send out carriers of different frequencies until it finds the one which your modem likes; thus automatically setting the appropriate data rate. When the connection is established, the cursor appears on your screen. You should then type two spaces or (cr)'s (enter). The QZX node then asks "Your FIRST name:" when you reply (send enter when finished) it replies "Your LAST name:" which you should then type in. The computer then checks for errors by asking "XXX XXX, right? (y,n)" where XXX represents the names you have typed in. If a mistake has been made, your names are requested again. When they are received correctly, the node produces a screen of welcome and explanation and then asks for your city and state. It checks for correct reception of this information and then asks you to "Pick a password". After you do, it says "XXX right? (y,n)" where XXX is your password. Remember this password because the computer will ask for it each time you sign on. The preliminaries are now complete, so the computer sends the usual initial screen and gives you the main menu. The first time you sign on, you should type A to Answer self-prompting questionnaire for statistical purposes.

The first time you sign on to the node directly, you are allowed 30 minutes. When you next sign on, the computer will just ask for your names and password and then pass you directly to the main menu. You will now be allowed up to 45 minutes for one call with a total of 120 minutes per day. That should be enough time to keep the long distance telephone companies happy.

FIDOGRAMS

To send messages to QZX via the FIDO NET system you need to establish an account at your nearest FIDO NET node using the procedures adopted by that node. You then go to a special FIDO NET message section (usually number five) and send the message following the prompts given there. Remember that the QZX node is net 15, node 1006 (15/1006). Send the message to ALEX BURR or QZX. We will get it here and send a reply, if necessary, to you which will appear in the FIDO NET message section of your node. If you do not know the telephone number of your nearest node, you can Type the appropriate file from any node including the QZX node. Because the list is LLONNNG this can become expensive. Send us a self-addressed postcard with the area code you can access and we will look up a nearby node for you.

THINGS TO REMEMBER

QZX FIDO NET telephone number:
(505) 646-5194
Signoff by sending G or by
hanging up the phone.
Send a couple of initial spaces
at logon.
Get help screens by typing ?
Type ^S (control S) to pause
FIDO to read a screen.
Type ^Q (control Q) to resume.
Have fun and I hope this
new service is useful to you.

Hot Chassis TV Sets

John Shelley, WA1IAO

I have discovered, lately, that some of the "hot chassis" color TV sets that I mentioned in my article (QZX October 1985) have full-wave bridges instead of the simple half-wave rectifiers.

This makes their use as a monitor less desirable because they DEFINITELY

NEED AN ISOLATION TRANSFORMER. I have found that the circuit board chassis ground runs about 75 VAC from ground (neutral).

This is a departure from the way the cheaper sets have been made for many years. I seriously think that they have done this on purpose to discourage people from full utilization of the sets.

It is obvious that each chassis (circuit board) is made to use for TV, Monitor, or RGB monitor, also remote control and other garbage. They actually break portions off, at perforations to eliminate or allow different features.

The normal and newer rectifier circuits are show in the figure with the danger point identified.
(Editor's note: Finding isolation transformers is hard and expensive! An old trick is to take two surplus filament transformers and hook them up "back-to-back"- connecting the 6.3 or 12.6 windings of each together and using the 110 input on one as the primary and the 110 input on the other as the secondary.)

Machine Code and M-Log
Alex. F. Burr K5XY

Some suggestions and comments from OH4NC, Holger, got me started thinking about elementary machine code problems (the only kind I know anything about). Here I will refer to the nice logging program from N9BBN which appeared in the August 1985 issue of QZX and to the article on the USR command which appeared in the November 1984 issue of QZX. (Back issues $1.00.)

ON0NC first made some comments about the basic M-Log program. He said, "I am glad that there are some MC wizards among us to make the ZX 81 work faster; I have yet to learn to master that aspect of computing." Then he added, "Looking through the Basic M-Log program, I noticed that part would not work in Fast mode because the computer would continuously look for a processed key without displaying a picture. The solution is simple; just add three lines at 65, 188 and 315, all identical -- PAUSE 4E4. Now even Fast mode works. Also note that in line 135 the second 59 should be followed by a space before the last ". The same goes for the second CW in line 470. The last number in the second row of the decimal listing (i.e. 19?) should not be there."

These last comments do not refer to any error in the listing printed in the August issue. If you look very closely, you will find that the spaces referred to above do appear in the listing. It is just because they appear at the end of a line that they are very hard to spot. The questionable digit in the decimal listing is just an extra blotch which appeared at the edge of the printing block and is not a number. But again it takes a sharp eye to notice this.

Bo and I are aware that it is very difficult to correctly enter some of the listings which appear in QZX, particularly if the logic of the program is hard to follow. We do not know of an easy solution to this problem; so we print the best copy that we can produce in the time available. We just cannot afford the time necessary to retype all the programs we receive. At the very least, the reader can follow the ideas of the programmer through the BASIC listing.

We know it is impossible for a beginner to follow a machine language segment of a program such as the 1 REM statement in the M-Log program. Here I will explain for a beginner what is going on.

Of course, everybody knows that the computer does not directly respond to a BASIC statement like GOTO but is directed by 0's and 1's in its memory location. The BASIC statements just put the appropriate numbers in these locations. The programmer can speed the program up by putting those 0's and 1's in directly without going through the interpreter. This process is called machine language programming.

As detailed in the November 1984 QZX, the USR command lets BASIC refer to the directly entered machine code. All the odd looking REM statement in M-Log does is put the correct 0's and 1's in known locations for the USR function.

It would be possible to put these 0's and 1's in the right places by keying in the exact information shown in the REM statement. But it would be difficult to do so because it is hard to distinguish, for example, between the token (or single command key) PRINT and the four keystrokes P R I N T. This difficulty is why N9BBN provided a machine code loader in lines 1000 to 1050 at the end of his program. Each time the loader pauses, the reader is to input the next decimal number from the POKE listing given at the end of the article. The computer then automatically translates the decimal numbers into the appropriate 0's and 1's and places them in the correct memory

location. This loader program will automatically overwrite anything in the 1 REM statement and all will be well as long as you have made the REM statement long enough (at least 269 characters in this example). The 1 REM statement (rather than some other REM statement is used because one always knows just where in memory the 1 REM statement is going to begin; hence the correct USR call can be made (lines 50 and 300 in M-Log).

Every machine language programmer has his own favorite machine code loader program. Once the machine code is loaded, the loader program (in this case lines 1000 to 1050) can be erased.

The loader given with M-Log is about as simple and straight forward as they come. OH0NC sent along a more complex and flexible one which is printed after this article. His program, with line numbers 9700 to 9790 follows two paragraphs which show what was put into the loader and what it prints out. The printouts are arranged with the first column giving the initial memory location for that line and followed by the decimal contents of that location and the four following locations. The last column gives a check sum of these five locations. This check sum is just the arithmetic sum of the decimal contents of the five locations. If the machine code listing includes these check sums, the entry process can be checked for errors.

I hope this brief description of some machine code ideas will help other beginners understand strange 1 REM statements and help readers recognize machine code loaders when they see them.

BITS AND BYTES

59. KP4MD writes as remembering reading that some users of the Byte Back M-16 16K RAM module are experiencing crashes in machine language programs. He purchased a M-16 three years ago and had the same problem. He wrote to Byte Back and was told that this could be fixed by connecting together pins 9 and 10 of the 74LS10, U14, and cutting the foil from pin 9 of the 74S74, U3. Since then he has had no problem running any program.

60. The ROM of the T/S 2068 has a bug which results in the wrong answer for INT(-65536).

UNCLASSIFIED ADS

WANTED: UNCLASSIFIED ADS for publication in QZX. Cost is 1 cent for each keystroke (characters, blanks, etc.). Payment must be included with order. This is an excellent way to sell your program or unwanted equipment, ask for help, or find a specific program. Send your ad with payment to QZX, 2025 O'Donnell, Las Cruces, NM 88001.

FOR SALE: CWSS users! MLI 2.0 permits QSK operation without prompting and can save Rx text for review on the screen or hard copy. Send $12.50 for MLI 2.0 or SASE for info sheet. John McGinley N9BBN/203 Milwaukee St./Mauston, WI 53948.

FOR SALE: Timex Sinclair 2040 personal printer paper for 3 roll packs at $1.50, 4 roll packs by Labelon for $2.00, please include $2.00 for UPS shipping. Send to Dale Johnson WB9NRK, 1331 Bellevue Lot 371, Green Bay, Wis. 54302.

FOR SALE: 2 TS1000's, 2 16K's, 1 Memotech 16K, Thermal printer, 11 rolls paper, TS1000 board w/parts, 3 word proc. prog's, Rompak ZX PRO/FILE w/QUICKLOAD doc's and updates, etc. $100.00 Russ Larson, Box 124, Somers MT 599323.

FOR SALE: Complete Timex/Sinclair 2068 system. 2068, Modem, 2040 printer w/paper, 2020 recorder. Books and software. $300 or offer. Scott Harvey, N.5011 Idaho Road, Newman Lake, WA 99025 or 509-266-1303.

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DEC-LOADER READ OR WRITE ? (R/W)
START ADDRESS   16514        W
FINISH ADDRESS  16578
16514-251 249 250 252 148  = 1150
16519-0   2   8   6   4    = 20
16524-126 124 200 100 150  = 700
16529-64  36  48  52  22   = 222
16534-65  35  28  38  56   = 222
16539-34  36  38  42  64   = 214
16544-


DEC-LOADER READ OR WRITE ? (R/W)
START ADDRESS   16514        R
FINISH ADDRESS  16543
16514-251 249 250 252 148  = 1150
16519-0   2   8   6   4    = 20
16524-126 124 200 100 150  = 700
16529-64  36  48  52  22   = 222
16534-65  35  28  38  56   = 222
16539-34  36  38  42  64   = 214
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73, W4GHV & K5XY

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